

Response Under 37 CFR §41.37  
Application No. 10/644,791  
In Support of Notice of Appeal Dated April 5, 2006  
Paper Dated: April 20, 2007  
Attorney Docket No. 3833-030392

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

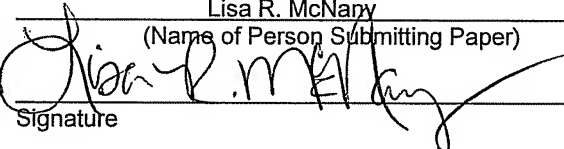
Application No. : 10/644,791 Confirmation No. : 7402  
Applicants : Anthony A. Gallo et al.  
Filed : August 19, 2003  
Title : Flame Retardant Molding Compositions Containing  
Group VIA Metal Oxides  
Group Art Unit : 1712  
Examiner : Robert E. L. Sellers  
Customer No. : 28289

MAIL STOP APPEAL BRIEF – PATENTS  
Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

**APPELLANT'S BRIEF UNDER 37 C.F.R. §41.37**

Sir:

The present Appeal Brief is re-submitted in response to the Notification of Non-Compliant Appeal Brief dated March 22, 2007 and in support in the Notice of Appeal filed on April 5, 2006, and received April 7, 2006 by the United States Patent and Trademark Office.

I hereby certify that this correspondence is being submitted electronically to the United States Patent and Trademark Office on April 20, 2007.	
Lisa R. McNary	
(Name of Person Submitting Paper)	
	04/20/2007
Signature	Date

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The headings used hereinafter and that which is set forth under each heading are in accordance with 37 C.F.R. §41.37(c)(1).

#### **I. REAL PARTY IN INTEREST**

Henkel Loctite Corporation is the Assignee of the entire right, title and interest in the above-identified application, as evidenced in the Assignment recorded August 19, 2003 at Reel 014423, Frame 0698. Henkel Loctite Corporation was merged into Henkel Corporation effective January 1, 2004, and, as such, is the real party in interest in this Appeal.

#### **II. RELATED APPEALS AND INTERFERENCES**

There are no appeals or interferences known to Applicants, Applicants' legal representative or Assignee, which will directly affect, or be directly affected by or having a bearing on, a decision in the present appeal.

#### **III. STATUS OF CLAIMS**

Claims 1-15 and 25-27 are pending in the present application and are appealed. Claims 16-24 have been cancelled.

Claims 1-15 and 25-27 stand rejected under 35 U.S.C. §103(a) as allegedly being obvious over U.S. Patent No. 6,432,540 to Gallo and Japanese Patent Nos. 11-269347 and 10-212396 in view of Japanese Patent No. 11-100492.

Claims 1-15 and 25-27 stand rejected under 35 U.S.C. §103(a) as allegedly being obvious over JP '492, in view of the Gallo patent and JP '347.

#### **IV. STATUS OF AMENDMENTS**

No amendments to the claims have been made after the final rejection.

## **V. SUMMARY OF CLAIMED SUBJECT MATTER**

In one embodiment set forth in Claim 1, Appellants have discovered a flame retardant molding composition substantially free of halogen, phosphorous and antimony, comprising:

- an epoxy resin;
- melamine cyanurate; and
- a transition metal oxide of a Group VIA element.

See page 2, lines 21-29 of the specification.

In another embodiment set forth in Claim 12, Appellants have discovered a flame-retardant molding composition substantially free of elemental halogen, phosphorous and antimony, comprising:

- about 4 weight % to about 12 weight %, based on the total weight of the composition of an epoxy resin;

- about 0.1 weight % to about 3.5 weight %, based on the total weight of the composition of melamine cyanurate;

- about 0.1 weight % to about 2 weight %, based on the total weight of the composition of tungsten trioxide;

- about 0.001 weight % to about 10 weight %, based on the total weight of the composition of a phenolic hardener; and

- about 10 weight % to about 85 weight %, based on the total weight of the composition of a filler material.

See page 5, line 32; page 6 lines 5-13 and lines 25-30; page 7, lines 1-4 and lines 24-33 and page 8, lines 9-17 of the specification.

In another embodiment set forth in Claim 27, Appellants have discovered a flame-retardant molding composition substantially free of elemental halogen, phosphorous and antimony, comprising:

- about 4 weight % to about 12 weight %, based on the total weight of the composition of an epoxy resin;

about 0.1 weight % to about 3.5 weight %, based on the total weight of the composition of melamine cyanurate;

about 0.1 weight % to about 2 weight %, based on the total weight of the composition of tungsten trioxide;

about 0.001 weight % to about 10 weight %, based on the total weight of the composition of an anhydride hardener; and

about 10 weight % to about 85 weight %, based on the total weight of the composition of a filler material.

See page 5, line 32; page 6 lines 5-13 and lines 25-30; page 7, lines 1-4 and lines 24-33 and page 8, lines 9-17 of the specification.

## **VI. ISSUES TO BE REVIEWED ON APPEAL**

1. Whether claims 1-15 and 25-27 are not obvious under 35 U.S.C. §103(a) over U.S. Patent No. 6,432,540 to Gallo and Japanese Patent Nos. 11-269347 and 10-212396 in view of Japanese Patent No. 11-100492?

2. Whether claims 1-15 and 25-27 are not obvious under 35 U.S.C. §103(a) over JP '492, in view of the Gallo patent and JP '347.

## **VII. ARGUMENT**

### **A. Obviousness based on a combination of elements from multiple references must be properly articulated.**

Assessment of obviousness of claimed subject matter requires determining the scope and content of the prior art, ascertaining the differences between the prior art and the claims and resolving the level of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 985; 78 USPQ2d 1329, 1335 (Fed. Cir. 2006), citing *Dann v. Johnston*, 425 U.S. 219, 226 (1976). Mere identification of the claimed elements in the prior art is not sufficient to establish obviousness. *Id.* There must be articulated "reasons one skilled in the art would have been motivated to select the references and to combine

them to render the claimed invention obvious". *Kahn*, 441 F.3d at 986 78; USPQ2d at 1335. *See also, In re Rouffet*, 149 F.3d 1350; 47 USPQ2d 1453 (Fed. Cir. 1998).

**B. The use of JP '492 as a secondary reference with the primary references is inappropriate because there is no suggestion of the desirability of combining their teachings.**

The final Office Action notes that the primary references teach using certain transition metal oxides as flame retardants: tungsten trioxide (Gallo patent at col. 4, lines 35-37) and molybdenum oxide or tungsten trioxide (JP '347, pg. 4, par. 11, lines 1-6 and JP '396, pg. 2, par. 11). None of these three primary references teaches or suggests including an organic flame retardant (such as melamine cyanurate) with the transition metal oxides. The secondary reference of JP '492 is relied upon for supposedly teaching the use of melamine cyanurate together with a metal oxide (NiO, not a transition metal oxide) in order to improve the properties of the resulting composition in addition to fire resistance.

The final Office Action asserts that it would be obvious to include melamine cyanurate with the compositions of the primary references "in order to impart solder thermal resistance". While JP '492 discloses using melamine cyanurate as a flame retardant, it does not teach so doing to impart solder thermal resistance. The Office Action also asserts that "[t]he motivation to incorporate the melamine cyanurate of Japanese '492 into the blends of the primary references is entirely consistent with the objectives thereof". This ability to combine references does not render the resultant combination obvious, unless there is some suggestion for the reason of doing so. *Kahn*, 441 F.3d at 986; 78 USPQ2d at 1335. Where all the elements of the claimed subject matter are found in separate pertinent references, there must be a motivation by the general problem facing the inventor that would have led to the combination of elements recited in the claims. *Id.* The Examiner has not articulated reasons why one skilled in the art would combine the teachings of JP '492 with those of the primary references. The final Office Action only asserts that their teachings are consistent with their respective objectives. As detailed hereinafter, the Examiner has not made out a *prima facie* case of obviousness in combining JP '492 with the three primary references

since there is no motivation disclosed in any of the references for including the melamine cyanurate that is disclosed in JP '492 with the flame retardant compositions disclosed in the Gallo patent, JP '347 or JP '396.

**(1) JP '492 does not teach a benefit of including a metal oxide with melamine cyanurate in a flame retardant composition.**

JP '492 discloses using organic flame retardants (with optional metal oxide flame retardants) in an epoxy resin composition. The reference only considers that certain inorganic fire retardants may be optionally included as components. These optional fire retardants may be metal oxides and metal hydroxides. Nowhere does the reference appreciate that a Group VIA transition metal oxide provides improved flame retardant characteristics.

Metal hydroxides function as flame retardants by decomposing and producing water when exposed to heat. A transition metal oxide does not accomplish such a function. Therefore, one skilled in the art would not be motivated to substitute the tungsten trioxide of Gallo with the optional metal hydroxide taught by JP '492.

The only metal oxide that is disclosed in JP '492 is nickel oxide, which is an oxide of a Group VIIB element. Nowhere does JP '492 suggest that including another component to the melamine cyanurate will result in a significantly improved flame retardant composition. Para. 23 of JP '492 explains that an excessive amount of organic flame retardant reduces heat resistance. The statement in the Office Action that JP '492 teaches "incorporating a melamine cyanurate together with a metal oxide in order to impart solder thermal resistance along with fire resistance" mischaracterizes its teachings. JP '492 teaches using a controlled amount of an organic flame retardant to maintain solder thermal resistance. It does not teach adding a metal oxide along with melamine cyanurate to impart solder thermal resistance. The reference only indicates that inorganic fire retardant agents may be included as optional components of a fire retardant agent.

The Advisory Action of April 14, 2006 asserts that JP '492 provides motivation to incorporate melamine cyanurate with the  $\text{WO}_3$  or  $\text{MoO}_3$  of Gallo, JP '347 or

JP '396 "to impart high temperature reliability and solder heat resistance along with fire retardance" per page 9, paragraph 23 of JP '492. The translation of paragraph 23 of JP '492 reads in pertinent part:

The content of the fire retardant agent of which the main component is organic, should be 1~ 20 wt %, preferably 5 ~ 15 wt %, more preferably it should be in the range of 9 ~ 15 %, of the total semiconductor encapsulating resin composition. If this content is too low, the fire retardant effect is poor. On the other hand, if the content is too high, the high temperature reliability and the solder heat resistance tend to decrease.

That passage explains that insufficient organic agent lowers the fire retardant effect while excess organic agent decreases "high temperature reliability and solder heat resistance". It does not suggest that melamine cyanurate is suitable or desirable for including in a flame retardant composition already containing a transition metal oxide flame retardant. It only teaches that the amount of organic agent should be controlled.

The motive articulated by the Examiner for combining an organic fire retardant with metal oxides (to impart solder thermal resistance) is not presented by the references nor is there any reason provided that one skilled in the art would even consider solder thermal resistance as a motivating factor. In the absence of a motive to supplement the metal oxide flame retardants of the primary references (Gallo patent, JP '347 or JP '396) with the organic flame retardant of JP '492, a *prima facie* case of obviousness has not been established.

Accordingly, there is no suggestion to combine the organic agent of JP '492 with the flame retardant compositions of Gallo, JP '347 or JP '396. When both types of flame retardant compositions are functional (transition metal oxide and organic agent), there is no motivation to supplement one with the other.

(2) **JP '492 demonstrates that melamine cyanurate alone is sufficient for providing flame retardant properties to an epoxy resin composition.**

The Examples and Comparison Examples of JP '492 elucidate this point. A verified translation of JP '492 was submitted in this application on April 5, 2006 and entered in the record pursuant to the Advisory Action of April 14, 2006. Examples 6 and 7 of JP '492 included both melamine cyanurate and inorganic fire retardant agents, namely,  $\text{Mg}(\text{OH})_2$  and  $\text{NiO}$ . Examples 8 and 9 used only melamine cyanurate. See Table 1.

As reported in Table 3, there was no difference in the flame retardant properties between the tests reported for Examples 6 and 7 that included melamine cyanurate alone and the tests reported for Examples 8 and 9 (melamine cyanurate with inorganic fire retardant agents) with inorganic components. Moreover, the Examples without an inorganic component (8 and 9) exhibited generally better flow properties (150 and 230 poise vs. 200 and 250 poise) and identical solder thermal resistance to Examples 6 and 7 which used inorganic flame retardants.

Examples 6-9 of JP '492 show that the inorganic flame retardants provided insignificant benefit to the compositions. These results would suggest to one skilled in the art that melamine cyanurate alone is sufficient as a flame retardant and adding an inorganic flame retardant would not impact the composition significantly.

Contrary to these inconclusive results reported in JP '492 that a metal oxide ( $\text{NiO}$ ) has no significant effect on a flame retardant composition containing melamine cyanurate, Applicants have demonstrated a synergistic effect of using melamine cyanurate and a transition metal oxide as flame retardants in a molding composition. See Evidence Appendix, the Declaration Under 37 C.F.R. §1.132 submitted April 12, 2005.

The Examiner has not provided a properly reasoned basis to combine the teachings of JP '492 with those of the primary references as is required to establish obviousness. *Kahn*, 441 F.3d at 987; 78 USPQ2d at 1335. Since JP '492 does not report any improvement achieved when melamine cyanurate is used in combination



with nickel oxide as a flame retardant over melamine cyanurate alone, there is no motivation provided by any of the references for modifying the teachings of the Gallo patent or JP '347 or JP '396 to include melamine cyanurate along with the Group VIA transition metal oxides disclosed therein. The Gallo patent, JP '347 and JP '396 all already contain flame retardants in the form of Group VIA transition metal oxides. Nothing in JP '492 indicates or suggests any improved results that might occur if melamine cyanurate was included with a transition metal oxide. As such, claims 1-15 and 25-27 define over the combined teachings of the Gallo patent, JP '347, and/or JP '396 with JP '492.

**C. No motivation exists in the cited references for replacing the nickel oxide of JP '492 with the tungsten trioxide of Gallo or JP '347.**

In the rejection based on JP '492 as the primary reference, the Gallo patent and JP '347, the Examiner asserts that it would be obvious to use the  $\text{WO}_3$  of Gallo and JP '347 as the "metal oxide" disclosed in JP '492. The asserted motivation is to improve the moisture resistance of the epoxy composition and to improve the balance between fire retardance and hardenability.

At col. 1, lines 28-32, Gallo states that phosphorous containing compounds are undesirable in that they tend to have a high moisture absorption rate. Hence, Gallo teaches at col. 5, lines 49-51 that transition metal oxides are substitutes for phosphorous containing compounds because they do not increase the rate of moisture absorption. The moisture resistance of Gallo comes from avoiding a phosphorous-containing compound. There is no motivation to substitute the NiO of JP '492 with the Gallo transition metal oxide since such a substitution of NiO by a transition metal oxide would not be made to replace a phosphorous compound to reduce moisture absorption. As such, replacing NiO with  $\text{WO}_3$  would not improve moisture resistance of the epoxy composition.

Further, while both JP '492 and Gallo describe using some type of metal oxides, their teachings are not necessarily combinable without some motivation to do so. *Kahn*, 441 F.3d at 986; 78 USPQ2d at 1335.

The Examiner asserts that motivation for balancing fire retardance and hardenability is found in JP '347, which indicates that low amounts of MoO or ZnO reduce fire retardancy and higher amounts thereof negatively impact hardenability. This teaching in JP '347 does not suggest that WO<sub>3</sub> is a substitute for the NiO flame retardant disclosed in JP '492. It only indicates that the amount of transition metal oxide should be controlled at a particular level to control properties. The need to control the level of a transition metal oxide to balance composition properties does not mean that a transition metal oxide should be used to replace the NiO of JP '492. In fact, JP '347 indicates that the oxide may be an oxide of zinc, tin or transition metals, including molybdenum and tungsten. It does not suggest that a transition metal oxide is preferable over a metal oxide such as the nickel oxide disclosed in JP '492. As such, JP '347 gives no specific motivation to replace the NiO of JP '492 with a transition metal oxide. This mere opportunity to combine the teachings of JP '347 and JP '492 does not establish obviousness to do so. The Examiner has not established the desirability of modifying JP '492.

Again, while JP '347, the Gallo patent and JP '492 all relate to flame retardant compositions, in the absence of some motivation to alter the teachings of JP '492, the *prima facie* case of obviousness of claims 1-15 and 25-27 has not been established.

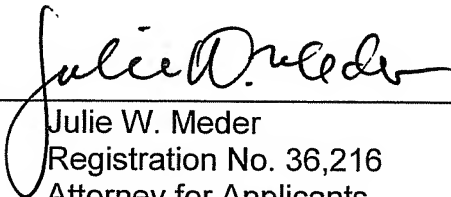
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### **VIII. CONCLUSION**

In view of the foregoing, reconsideration of the rejections of claims 1-15 and 25-27 is respectfully requested. Allowance of pending claims 1-15 and 25-27 is respectfully requested.

Respectfully submitted,

THE WEBB LAW FIRM

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**CLAIM APPENDIX**

1. A flame retardant molding composition substantially free of halogen, phosphorous and antimony, comprising:
  - an epoxy resin;
  - melamine cyanurate; and
  - a transition metal oxide of a Group VIA element.
2. The molding composition of claim 1, wherein the transition metal oxide is tungsten oxide.
3. The molding composition of claim 2, wherein the tungsten oxide is tungsten trioxide.
4. The molding composition of claim 1, further comprising a phenolic novolac hardener.
5. The molding composition of claim 4, wherein the amount of the phenolic novolac hardener ranges from about 1.5 weight % to about 10 weight % based on the total weight of the molding composition.
6. The molding composition of claim 1, wherein the epoxy resin comprises an epoxy cresol novolac resin.
7. The molding composition of claim 1, wherein the epoxy resin comprises a biphenyl epoxy resin.
8. The molding composition of claim 1, wherein the melamine cyanurate is present in an amount of from about 0.1 to about 3.5 percent by weight of the molding

composition and the transition metal oxide is present in an amount from about 0.1 to about 2 percent by weight of the molding composition.

9. The molding composition of claim 1, wherein the amount of the epoxy resin ranges from about 4 weight % to about 12 weight % based on the total weight of the molding composition.

10. The molding composition of claim 9, wherein the amount of the epoxy resin ranges from about 5.5 weight % to about 8.5 weight % based on the total weight of the molding composition.

11. The molding composition of claim 1, further comprising a bulk amount of a filler material.

12. A flame-retardant molding composition substantially free of elemental halogen, phosphorous and antimony, comprising:

about 4 weight % to about 12 weight %, based on the total weight of the composition of an epoxy resin;

about 0.1 weight % to about 3.5 weight %, based on the total weight of the composition of melamine cyanurate;

about 0.1 weight % to about 2 weight %, based on the total weight of the composition of tungsten trioxide;

about 0.001 weight % to about 10 weight %, based on the total weight of the composition of a phenolic hardener; and

about 10 weight % to about 85 weight %, based on the total weight of the composition of a filler material.

13. The molding composition of claim 12, further comprising from about 0.1 weight % to about 10 weight %, based on the total weight of the composition, of one or

more additives selected from the group consisting of colorants, mold release agents, coupling agents, catalysts, ion scavengers, metal oxides, metal hydroxides, pigments, adhesion promoters, toughening agents, UV absorbers, and antioxidants.

14. The molding composition of claim 12, wherein the epoxy resin comprises an epoxy cresol novolac resin.

15. The molding composition of claim 12, wherein the epoxy resin comprises a biphenyl epoxy resin.

16-24. (Cancelled).

25. The molding composition of claim 1, further comprising an anhydride hardener.

26. The molding composition of claim 25, wherein the amount of the anhydride hardener ranges from about 1.5 weight % to about 10 weight % based on the total weight of the molding composition.

27. A flame-retardant molding composition substantially free of elemental halogen, phosphorous and antimony, comprising:

about 4 weight % to about 12 weight %, based on the total weight of the composition of an epoxy resin;

about 0.1 weight % to about 3.5 weight %, based on the total weight of the composition of melamine cyanurate;

about 0.1 weight % to about 2 weight %, based on the total weight of the composition of tungsten trioxide;

about 0.001 weight % to about 10 weight %, based on the total weight of the composition of an anhydride hardener; and

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about 10 weight % to about 85 weight %, based on the total weight of the composition of a filler material.

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### **EVIDENCE APPENDIX**

Appellants submit herewith:

(1) a copy of the April 11, 2005 Declaration Under 37 C.F.R. §1.132 submitted April 12, 2005 and entered in the record pursuant to the Office Action of May 9, 2005.

(2) a copy of the certified translation of Japanese Patent No. 11-100492 submitted with the Request for Reconsideration After Final Rejection dated February 24, 2006 and entered in the record pursuant to the Advisory Action of April 14, 2006.



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**RELATED PROCEEDING APPENDIX**

None.